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ABSTRACT

Recent theoretical developments have suggested that understanding the thoughts contained in prose material and storing the information contained in prose material are the same thing. A test which was purported to measure the information stored during the reading of prose passages was found to correlate .98 with subjective estimates of the percent of thoughts understood while reading the prose materials. Another technique has been developed which automatically produces tests of information stored on any prose material. This measurement technique is being manually implemented now. In the future, a carrel could be located in one's home or work, thus eliminating the need to physically travel to another location to learn and to receive credit for having learned. The point is made that individualized learning and individualized credit for learning will probably become more important as time goes on. In relation to this development is the need for the selection and procurement of appropriate instructional objects, such as textbooks, films, workbooks, and tapes. An answer to this need would be the establishment of learning clinics. A person in need of knowledge in a particular area would go to a learning clinic and receive help in collecting information. For this service, he would pay a fee. The advantage of this system of learning is that it could easily supplement any existing or future non-residential system. (Author/CK)

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IMPLICATIONS OF A NEW TECHNIQUE FOR MEASURING THE UNDERSTANDING GAINED FROM READING FOR NON-RESIDENTIAL PROGRAMS

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Let me share a daydream of mine with you. I see a student sitting down at a carrel and pushing buttons on a console which cause the pages of a book to appear on the screen. The student begins reading the book. At random intervals, such as around 5 to 10 minutes, a test of what the student has been reading appears on the screen. The student spends around 30 seconds to one minute taking the test and then goes on reading. The test is valid for measuring whether or not the student had understood the thoughts or stored the information contained in the written material he was supposedly reading. Each test has an infinite number of alternate forms, so the student could re-read material several times to achieve criterion mastery. And, the uniqueness of each test would prevent one student from giving the answers to another student.

When the student had finished a particular chapter, book, or some other specified population of prose material, his degree of understanding would be averaged. If this average met the criterion of mastery, such as 90 percent, credit for having read and understood the information

contained in this material would be automatically stored on the student's master tape file. A professor or a university administrator could use the information in various ways, such as by evaluating prerequisites for a course or by the assignment of credit for a course or a body of knowledge. Employers using these data could more precisely evaluate the background knowledge of a job applicant, instead of requiring certain course work or degrees.

Before dreaming on, let me stop and present to you the recent research which suggests that we may be close to having the know-how required to impliment this dream. Even with the know-how, however, a great deal of hardware and software development will be required before such a scheme could be put into operation.

Recent theoretical developments have suggested that understanding the thoughts contained in prose material and storing the information contained in prose material are the same thing (Carver, 1971a). And, recently presented empirical data support this theory. A test which was purported to measure the information stored during the reading of prose passages was found to correlate .98 with subjective estimates of the percent of thoughts understood while reading the prose materials (Carver, in press).

The aforementioned objective test of information stored required extensive empirical research for its development, thus offering little potential for providing a generic objective method which could be applied to any prose material. However, another technique has been developed which automatically produces tests of information stored on any prose

material (Carver, 1971b). That is, a method now exists which would allow an infinite variety of tests to be prepared automatically and instantaneously by a computer using the original prose material as the only input data. Pilot data collected at the American Institutes for Research suggest that scores on this type of test are also highly related to subjective estimates of thoughts understood while reading. Thus, it appears that it may be possible in the near future to implement the dream of being able to measure and validly certify whether a student has understood all of the material that he has supposedly read.

This measurement technique is being manually implemented now. Tests of stored information, called reading-storage tests, have been developed for prose materials without the time saving aid of a computer. However, computer technology will be required to achieve the previously related dream.

It is fun to speculate upon the effect such a technological-scientific development would have upon course requirements, student learning, degree requirements, etc. For example, such a carrel could be located in one's home or at home's work, thus eliminating the need to physically travel to another location to learn and to receive credit for having learned. With the futurists predicting that during the next 30 years, many more citizens will have much more leisure time and will focus upon the fulfillment of self-esteem and self-actualization needs, probably there also will be much more emphasis upon continual learning throughout one's lifetime. Thus, individualized learning and individualized credit for learning will probably become more important as time goes on.

One daydream often runs into another daydream in a swiftly flowing stream of consciousness. The next daydream I would like to relate is concerned with the selection and procurement of appropriate instructional objects, such as textbooks, films, workbooks, and tapes. Rothkopf (1970) has properly pointed out that education has been investing a great deal of time and money on instructional objects while seemingly disregarding the instructional environment. He has used the term "Object Acquisition" for one class of activities in this important aspect of learning.

In colleges, one of the most important, but often overlooked, functions of a professor is his selection of the textbook which he recommends (or demands) that the students acquire. Most of the learning that occurs in college takes place outside the classroom, and the predominant part of this learning occurs via the reading of prose materials. Thus, one of the most important parts of college learning is the selection of the books which the faculty thinks the students would benefit from reading.

While attempting to optimize the learning environment for higher education, i.e., while conjuring up ways to increase learning efficiency so that students (and taxpayers) get more for their money, I had the following daydream. I call this dream, my clinical-learning dream, because it is so similar to much of what happens when a patient goes to a clinic with a physical or mental health problem.

First, I see a person calling for an appointment at the learning clinic. He later travels a short distance to the clinic and is confronted

by the receptionist. She asks him the nature of his problem and he responds that he wants to know more about psychology. The receptionist refers him to a technician who specializes in collecting basic data about the person which will help diagnose this individual's present condition, with respect to general knowledge and general ability to learn. After collecting this information and administering certain tests, the individual and his record are presented to Dr. Know. Dr. Know used to be a professor of psychology at State University before it folded due to a lack of students and a lack of funds. He likes his job much better now, anyway, because he has time to deal with students on an individual basis. He also likes the idea of the students coming to him only when they, themselves, perceive that they need help, and paying him only when he actually administers advice or knowledge.

The individual enters Dr. Know's office and they spend some time talking about what it is that is troubling the individual with respect to his knowledge or know-how deficit. The individual says that he has always heard people talk about Freud and he would like to learn more about him. And, he would also like to know why people do some of the crazy things they do. Dr. Know quickly diagnoses the individual's problem and then prescribes what the individual should do, or what books he should read. Dr. Know has a small computer console at his side which has stored all of the medicines which he may prescribe. That is, all of the psychology courses that are offered on a group basis by universities in the surrounding area are listed. The traditional psychology textbooks are listed. Lay readings in psychology as well as journal articles and

books in psychology are listed. In this particular case, he prescribes a paperback book on Freud written for the layman. And, he prescribes an introductory psychology course at a university close to the individual's home. Dr. Know next calls for a printout of the course and the book. Then, he gives this prescription to the individual with some additional advice about how he should go about procuring these medicines, together with his recommended dosages. As he leaves, Dr. Know suggests that the individual give him a call in one week to see if the prescription is doing the trick.

The individual leaves the clinic and he is automatically billed for his tests and the office visit. The individual likes clinical learning (he learned how to build a boat from information acquired at another clinic) because he only pays for what he gets. If he is not satisfied with the diagnosis or the results, he has several options. He may change clinics or change doctors. Or, he may call the same doctor back for further help. He knows he will be billed at a flat rate for his telephone time and he can do the calling at the convenience of his office or his work. And, if he desires to receive permanent credit for the information which he stores, he can pay for reading it at a carrel (see preceding daydream).

Clinical learning is only a daydream at this time, but it seems to be an approach which can easily supplement any existing or future non-residential system. Thus, it may be just a matter of time until this idea is implemented on a scale and in a manner similar to medical care--i.e., using hospitals and medical clinics as analogies. Hospitals, of

course, are analogous to the in-depth, mass education treatment now being applied in colleges and universities. It is the counterpart of the medical clinic that is conspicuously absent. That is, it is the ready accessibility of Dr. Know at the local level which is needed to fulfill the ultimate goal of non-residential programs in higher education.

I have been dreaming outloud partly because I have enjoyed telling you about what I have been thinking about and partly because I hope you will quickly inform me about the bad parts of the dreams. It is possible that I will begin to try to implement certain parts of these dreams, and I would appreciate advance warning concerning the nature of the nightmares I am likely to encounter.

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REFERENCES

Carver, Ronald P. A computer model of reading and its implications for measurement and research. Reading Research Quarterly, 1971, 6, 449-471. (a)

Carver, Ronald P. Procedures for constructing a variety of information-processing measures appropriate for prose materials. Silver Spring, Md.: Revrac Publications, 1971. (b)

Carver, Ronald P. Understanding, information-processing, and learning from prose materials. Journal of Educational Psychology, in press.

Rothkopf, Ernst Z. The concept of mathemagenic activities. Review of Educational Research, 1970, 40, 325-336.